

CLAIMS

What is claimed is:

- 5 1. A circuit for generating a plurality of phases of an input signal comprising:
 a phase generator operable as a voltage controlled oscillator and as a
voltage controlled delay line, said phase generator comprising a plurality of delay
blocks;
 a phase detector coupled in a first feedback loop with said phase
10 generator, said phase detector for comparing said input signal with a first output
signal of said phase generator when in an delay lock loop mode; and
 a phase-frequency detector coupled in a second feedback loop with said
phase generator, said phase-frequency detector for comparing said input signal
with a second output signal of said phase generator when in a phase locked loop
15 mode.
2. The circuit of Claim 1 further comprising a delay element disposed in said
second feedback loop between said phase generator and said phase-frequency
detector and wherein said delay element generates an output signal.
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3. The circuit of Claim 1 wherein said phase detector generates a control
signal to said phase generator to switch from said delay lock loop mode to said
phase locked loop mode.

4. The circuit of Claim 3 wherein said phase generator is operable for generating a plurality of phases of a second input signal when operating in said phase locked loop mode.

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5. The circuit of Claim 1 wherein each of said plurality of delay blocks comprises a plurality of delay elements coupled in series.

6. The circuit of Claim 5 wherein each delay block is associated with a
10 respective multiplexor for configuring a number of said plurality of delay elements coupled in series.

7. The circuit of Claim 6 wherein a first control signal generated by said phase detector causes said multiplexors to dynamically select the number of
15 said plurality of delay elements that are coupled in series.

8. The circuit of Claim 5 wherein a second control signal generated by said phase-frequency detector controls the delay time of each of said plurality of delay elements.

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9. The circuit of Claim 8 wherein said circuit suppresses skew of said plurality of phases of said input signal.

10. A method for generating multiple phases of an input signal comprising:
a phase generator accessing said input signal, said phase generator
comprising a plurality of dynamically controlled delay blocks;
configuring said plurality of dynamically controlled delay blocks as a
5 voltage controlled delay line in an delay lock loop mode to perform coarse
adjustment; and
operating said phase generator as a voltage controlled oscillator in a
phase locked loop mode for fine adjustment.

10 11. The method as recited in Claim 10 wherein each of said plurality of
dynamically controlled delay blocks comprises a plurality of series coupled delay
elements and further comprising:
coupling each of said plurality of dynamically controlled delay blocks with
a respective multiplexor wherein an output of each of said delay elements is an
15 input to said respective multiplexor.

12. The method as recited in Claim 10 wherein said delay lock loop mode
varies delay elements of said dynamically controlled delay blocks until a coarse
match is encountered using a phase detector.

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13. The method as recited in Claim 12 wherein said phase locked loop mode
varies the delay of the delay elements selected in said delay lock loop mode to
perform fine adjustment using a phase-frequency detector.

14. The method as recited in Claim 13 wherein said phase locked loop mode suppresses skew of a plurality of phases of said input signal.

5 15. A wide frequency range delay lock loop circuit comprising:
a configurable phase generator configurable:

in a first mode wherein said phase generator is coupled with a
phase detector in a delay lock loop (DLL); and

10 in a second mode wherein said phase generator is coupled with a
phase-frequency detector in a phase locked loop (PLL).

16. The circuit of Claim 15 wherein said phase detector compares an input
signal with a signal received via a first feedback line and generates a first control
signal based thereon.

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17. The circuit of Claim 16 wherein said phase generator comprises:
a plurality of configurable delay blocks, each of which comprises a
plurality of delay elements coupled in series.

20 18. The circuit of Claim 17 wherein an output of each of said delay elements
comprises an input of a respective multiplexor for selectively coupling said
plurality of delay elements with said first feedback line.

19. The circuit of Claim 16 wherein said phase detector generates a second control signal for changing between said first mode and said second mode.

20. The circuit of Claim 15 wherein said phase-frequency detector compares
5 an input signal with a signal received from said phase generator via a second feedback line and generates a third control signal based thereon.

21. The circuit of Claim 20 wherein said phase generator further comprises:
a plurality of configurable delay blocks, each of which comprises a
10 plurality of delay elements coupled in series.

22. The circuit of Claim 21 wherein said third control signal controls the delay time of each of said plurality of delay elements.

15 23. The circuit of Claim 22 wherein skew of a plurality of phases of said input signal is suppressed.